CLAIMS

1 A drilling tool including a drill shaft for transmitting axial load, comprising a series of coaxial ring members connected together such that adjacent ring members are flexible in an axial plane relative to each other; characterized in that:

- each ring member is connected to an adjacent ring member by connecting member arranged to transmit torque therebetween; and
- axial supports extend between adjacent ring members so as to transmit axial loads therebetween.

2 A drilling tool as claimed in claim 1, wherein the connecting member and axial supports allow adjacent ring members to bend in one axial plane while remaining stiff in another axial plane offset by up to 90°.

3 A drilling tool as claimed in claim 2, wherein the connecting arms and axial supports are arranged such that the bending plane on one side of a ring member is different to that on the other side.

4 A drilling tool as claimed in claim 2 or 3, wherein the connecting member and axial support are constituted by the same physical structure.

5 A drilling tool as claimed in claim 4, wherein the physical structure comprises at least two axial links extending between circumferentially aligned points on adjacent ring members.

6 A drilling tool as claimed in claim 5, wherein the connection point of links extending axially from one side of a ring member are offset from those extending in the axial opposite direction by up to 90°.

7 A drilling tool as claimed in claim 4, wherein the physical structure comprises pairs of links extending between connection points on one ring member to connection points on an adjacent ring member circumferentially offset by up

to 90°, such that each connection point is connected by a pair of inclined links to the adjacent ring.

8 A drilling tool as claimed in claim 7, wherein the connection points of links extending from one side of a ring member are aligned with those extending in the axial opposite direction.

9 A drilling tool as claimed in claim 2 or 3, wherein the connecting member and axial support are constituted by separate physical structures.

10 A drilling tool as claimed in claim 9, wherein the axial support comprises at least two axial links extending between circumferentially aligned points on adjacent ring members, and the connecting member comprises inter-engaging teeth projecting from the adjacent ring members.

11 A drilling tool as claimed in claim 10, wherein the axial support comprises at least two axial links extending between circumferentially aligned points on adjacent ring members, and the connecting member comprises a torsion ring extending between the axial links and connected to a torsion link connected to one of the ring members at a point offset by up to 90° from the axial links.

12 A drilling tool as claimed in claim 11, wherein the part of the axial link extending between the torsion ring and the ring member to which the torsion link is connected is substantially more flexible that the part of the axial link extending from the torsion ring to the other ring member.

13 A drilling tool as claimed in claim 9, wherein the axial support comprises at least two axial links extending between circumferentially aligned points on adjacent ring members, and the connecting member comprises pairs of links extending between connection points on one ring member to connection points on an adjacent ring member circumferentially offset by up to 90°, such that each connection point is connected by a pair of inclined links to the adjacent ring.

14 A drilling tool as claimed in claim 13, wherein each axial link is connected at one end to one of the ring members, and at the other end is separated from the other ring member by a small distance such that when an axial compressive load is applied to the tool, the axial link is contacted by the other ring member.

15 A drilling tool as claimed in claim 13, further comprising operable load supports which are moveable between a first position in which they are located between the ring members at points between the axial links and contacted by the ring members when compression is applied so as to resist bending in that direction, and a second position in which they are positioned away from the ring members so as not to be contacted when compression is applied and so not to resist bending in that direction.

16 A drilling tool as claimed in claim 15, wherein the load supports comprise tension latches which, in the first position, are engaged by the ring members when tension is applied, and which, in the second position, are not engaged when tension is applied.

17 A drilling tool as claimed in claim 15 or 16, wherein the load supports are normally biased into the first position and can be moved into the second position by application of pressure on a button attached to an outer surface of each load member.

18 A drilling tool as claimed in claim 14, wherein the axial support is connected at one end to one of the ring members, and at the other end is separated from the other ring member by a small distance such that when an axial compressive load is applied to the tool, the axial support is contacted by the other ring member, and moveable between a first position in which the axial support located between the ring members and contacted by the ring members when compression is applied so as to resist bending in that direction, and a second position in which the axial support is positioned away from the ring members so as not to be contacted when compression is applied and so as not to resist bending in that direction.

19 A drilling tool as claimed in any preceding claim, wherein the various functional structures are defined by providing cutouts in a tubular member.

20 A drilling tool as claimed in any preceding claim, wherein adjacent ring members define a cell that is flexible in an axial plane, and the axial planes in adjacent cells are offset by a predetermined angle of up to 90°.

21 A drilling tool as claimed in claim 20, comprising two concentric drill shafts that are rotatable relative to each other such that when the axial planes of the cells are aligned, the tool can bend in that plane at that position, and when the axial planes of the cells are offset by the predetermined angle, bending of the tool at that point is resisted.

22 A drilling tool as claimed in any preceding claim, further comprising a fluid conduit extending along the drill shaft to allow a drilling fluid to be supplied from one end of the shaft to the other.

23 A drilling tool as claimed in any preceding claim, comprising a drilling assembly including a drill bit at one end of the shaft.

24 A drilling tool as claimed in claim 23, further comprising a rotary motor connected to the drill shaft for rotating the drill bit.